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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/628,361	07/29/2003	Sen-Chia Chang	CHAN3210/EM	4483

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EXAMINER	
VO, HUYEN X	
ART UNIT	PAPER NUMBER
2626	
MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/628,361	CHANG ET AL.	
	Examiner	Art Unit	
	HUYEN X. VO	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 May 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-11 and 13-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-11 and 13-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's argument with respect to the use of Laurila et al. reference has been fully considered and is persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Haverinen et al. (USPN 7197456).

2. Applicant's argument regarding "the verification score of Sukkar is a likelihood score ratio of the sound associated with the subword hypothesis and the speech segment consisting of a different sound, rather than being obtained by *inputting the normalized feature vectors* to the verification-unit corresponded classifier" is however, not persuasive. One of ordinary skill in the art at the time of invention to readily realize that by incorporating the teaching of Haverinen et al. into Sukkar, the claimed invention would have been realized. Haverinen et al. produce a set of normalization parameters (means and standard deviation) for used to normalize the current input speech feature vectors, which would then be used by the system of Sukkar to perform further processing as indicated in figure 4 (*feature vectors are received at step 322*).

3. The previous office action has been withdrawn in favor of a new non-final office action.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 8-11, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sukkar (USPN 6292778) in view of Haverinen et al. (USPN 7197456).

6. Regarding claim 1 and 11, Sukkar discloses a method and system (figure 4) for utterance verification comprising the steps of:

(A) extracting a sequence of feature vectors from an input speech (*col. 8, line 60 to col. 9, line 19 or referring to element 310 in figure 3*);

(B) inputting the sequence of feature vectors to a speech recognizer for obtaining at least one candidate string (*speech recognizer 312 in figure 3 produces a number of recognition candidates and sub-word segmentation; also referring to col. 9, line 59 to col. 10, line 19*);

(C) segmenting the input speech into at least one speech segment according to the content of candidate string, which comprises individual recognition units, wherein each speech segment corresponds to a recognition unit and each recognition unit corresponds to a verification unit (*speech recognizer 312 in figure 3 produces a number*

of recognition candidates and sub-word segmentation 312; or also referring to col. 9, line 59 to col. 10, line 19);

(E) utilizing a verification-unit corresponded classifier for each speech segment to calculate the verification score, where the sequence of verification feature vectors of the speech segment is used as the input of the classifier (*col. 10, line 58 to col. 11, line 32 or referring to the operation of figure 4*);

(F) combining the verification scores of all speech segments for obtaining an utterance verification score of the candidate string (*col. 10, line 58 to col. 11, line 32 or referring to the operation of figure 4*); and

(G) comparing the utterance verification score of the candidate string with a predetermined threshold so as to accept the candidate string if the utterance verification score is larger than the predetermined threshold (*col. 11, lines 1-32 or referring to the operation of figure 4*).

While the system of Sukkar inherently includes the step of normalizing extracted speech features for speech recognizer, Sukkar fails to explicitly disclose (D) generating a sequence of verification feature vectors for each speech segment according to the sequence of feature vectors of the speech segment, wherein the verification feature vectors are generated by normalizing the feature vectors using the normalization parameters of the verification unit corresponding to the speech segment, the normalization parameters of the verification unit are means and standard deviations of the feature vectors corresponding to the verification unit in training data, and these parameters are calculated in advance of runtime.

However, Haverinen et al. teach (D) generating a sequence of verification feature vectors for each speech segment according to the sequence of feature vectors of the speech segment, wherein the verification feature vectors are generated by normalizing the feature vectors using the normalization parameters of the verification unit corresponding to the speech segment, the normalization parameters of the verification unit are means and standard deviations of the feature vectors corresponding to the verification unit in training data, and these parameters are calculated in advance of runtime (*col. 6, lines 5-46; the standard deviation and mean of the test signal are pre-computed before runtime; They are used at runtime to normalize feature vectors of the test signal*).

Since Kukkar and Haverinen et al. are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Sukkar by incorporating the teaching of Haverinen et al. in order to improve speech recognition and verification accuracy.

7. Regarding claims 8 and 18, Sukkar further discloses the method and system as claimed in claims 1 and 11, respectively, wherein in step (F), the utterance verification score of the candidate string is the mean of the verification scores of the speech segments in the input speech (*col. 11, lines 5-15, averaging subword scores*).

8. Regarding claims 9 and 19, Sukkar further discloses the method and system as claimed in claims 1 and 11, respectively, wherein the input speech is corrupted by noise

(*figure 1, speech is received via a telephone network, thus, a certain amount of noise must be added to the speech signal when received*).

9. Regarding claims 10 and 20, Sukkar further disclose the method and system as claimed in claims 6 and 16, wherein the speech segments used for training are corrupted by noise (*speech recognizer 312 in figure 3 contains HMM models that are trained in advance; the speech used to train the speech recognizer 312 in advance inherently includes noise generated by either microphone of communication channel*).

10. Claims 3-7 and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sukkar (US 6292778) in view of Haverinen et al. (USPN 7197456), and further in view of Carey et al. (US 5526465).

11. Regarding claims 3 and 13, Sukkar fails to specifically disclose the method and system as claimed in claims 1 and 11, respectively, wherein in step (E), the classifier is a neural network, and the neural network is an multi-layer perceptron (MLP). However, Carey et al. teach that the classifier is a neural network, and the neural network is a MLP (*col. 11, lines 1-20*).

Since Sukkar and Carey et al. are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Sukkar by incorporating the teaching of Carey et al. in order

to increase discrimination between world models and personal models to improve the verification process.

12. Regarding claims 4 and 14, Sukkar further discloses that the verification score of a speech segment is the mean of the verification scores of the sequence of verification feature vectors corresponding to the speech segment (*col. 11, lines 5-15, averaging subword scores*). Sukkar, however, fails to specifically disclose wherein the MLP is used to calculate the verification score by inputting the verification feature vector and performing the feed-forward processing. However, Carey et al. teach wherein the MLP is used to calculate the verification score by inputting the verification feature vector and performing the feed-forward processing (*col. 9, lines 43-50, forward and backward pass calculations*).

Since Sukkar and Carey et al. are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Sukkar by incorporating the teaching of Carey et al. in order to improve speech recognition accuracy.

13. Regarding claims 5 and 15, Sukkar fails to specifically disclose the method and system as claimed in claims 3 and 13, respectively, wherein the MLP is trained by using an error back-propagation algorithm to reduce the mean square error between the verification score output of the MLP and the target value. However, CAREY ET AL. teach wherein the MLP is trained by using an error back-propagation algorithm to

reduce the mean square error between the verification score output of the MLP and the target value (*col. 11, lines 1-20 and col. 12, lines 1-20*).

Since Sukkar and Carey et al. are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Sukkar by incorporating the teaching of Carey et al.. in order to increase discrimination between world models and personal models to improve the verification process.

14. Regarding claims 6 and 16, Sukkar fails to specifically disclose the method and system as claimed in claims 5 and 15, respectively, wherein the MLP corresponding to the verification unit is trained by inputting the sequences of verification feature vectors of the speech segments corresponding to the verification unit and the sequences of verification feature vectors of the speech segments not corresponding to the verification unit. However, Carey et al. teach wherein the MLP corresponding to the verification unit is trained by inputting the sequences of verification feature vectors of the speech segments corresponding to the verification unit and the sequences of verification feature vectors of the speech segments not corresponding to the verification unit (*col. 10, line 43 to col. 11, line 34*).

Since Sukkar and Carey et al. are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Sukkar by incorporating the teaching of Carey et al. in order to train the speech recognizer to recognizer the speaker with high accuracy.

15. Regarding claims 7 and 17, Sukkar fails to specifically disclose the method and system as claimed in claims 6 and 16, wherein the target value is 1 if the speech segment corresponds to the verification unit and which is 0 if the speech segment does not correspond to the verification unit. However, Carey et al. teach wherein the target value is 1 if the speech segment corresponds to the verification unit and which is 0 if the speech segment does not correspond to the verification unit (*col. 11, line 60 to col. 12, line 7, P_p=0 and P_w=1, that means the speaker is not verified; and P_p=1 and P_w=0 means the speaker is verified*).

Since Sukkar and Carey et al. are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Sukkar by incorporating the teaching of Carey et al. in order to verify speaker with high accuracy.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUYEN X. VO whose telephone number is (571)272-7631. The examiner can normally be reached on M-F, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Huyen X Vo/ 9/1/2008
Primary Examiner, Art Unit 2626

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